

## CLAIMS

### What is claimed is:

1. A precise multi-pole magnetic component comprising:  
a substrate; and  
a plurality of layers of circuits formed on the surface of the substrate;  
wherein each layer of the circuit is separated from another by an insulating layer;  
5 the circuits on different layers are connected into a single circuit by drilling holes and  
filling them with soldering tin; the current input and output terminals on the top layer are  
reserved for connecting to a current source; each layer of the circuit has a meander  
structure for providing a current to flow in opposite directions to produce an alternate  
magnetic pole distribution; and the magnetic field distribution of each layer of the circuit is  
10 arranged to stack with enhancing configuration.
2. The precise multi-pole magnetic component of claim 1, wherein the circuit  
patterns on the surface of the substrate are formed using the printed circuit board (PCB)  
manufacturing technology.
3. The precise multi-pole magnetic component of claim 1, wherein the width of  
the circuit wire is between  $75\ \mu\text{m}$  to  $2500\ \mu\text{m}$ .
4. The precise multi-pole magnetic component of claim 1, wherein the gap  
between two adjacent circuit wires is between  $75\ \mu\text{m}$  to  $2500\ \mu\text{m}$ .
5. The precise multi-pole magnetic component of claim 1, wherein the meander  
structure of the circuits is a linear type extending along one-dimensional direction.
6. The precise multi-pole magnetic component of claim 1, wherein the meander  
structure of the circuits has an annular pattern.

7. A manufacturing method for precise multi-pole magnetic components, comprising the steps of:

providing a substrate; and

forming a plurality of circuit layers on the surface of the substrate using the PCB manufacturing technology;

wherein each layer of the circuit is separated from another by an insulating layer; the circuits on different layers are connected into a single circuit by drilling holes and filling them with soldering tin; the current input and output terminals on the top layer are reserved for connecting to a current source; each layer of the circuit has a meander structure for providing a current to flow in opposite directions to produce an alternate magnetic pole distribution; and the magnetic field distribution of each layer of the circuit is arranged to stack with enhancing configuration.

8. The manufacturing method of claim 7, wherein the width of the circuit wire is between  $75\ \mu\text{m}$  to  $2500\ \mu\text{m}$ .

9. The manufacturing method of claim 7, wherein the gap between two adjacent circuit wires is between  $75\ \mu\text{m}$  to  $2500\ \mu\text{m}$ .

10. The manufacturing method of claim 7, wherein the meander structure of the circuits is a linear type extending along one-dimensional direction.

11. The manufacturing method of claim 7, wherein the meander structure of the circuits has an annular pattern.